



11. Who Lives Here? Adopting a Plant, Animal, or Fungus

Overview: This activity introduces a suite of organisms that live in forests of northern Rocky Mountains and North Cascades. It features species representative of 3 forest communities: those dominated by ponderosa pine, lodgepole pine, and whitebark pine. Each student “adopts” an organism, learns about its characteristics and its relationship to fire, and gives a presentation on it to the class – illustrated by some form of art work¹.

Subjects: Science, Reading, Writing, Speaking and Listening

Duration*: 1-2 class periods for student preparation, 3-4 minutes for each presentation

Group size: Whole class

Setting: Classroom

Vocabulary: *biodiversity*

There is no need to finish this activity before doing further lessons in the curriculum. In fact, it may be helpful to spread the student presentations over several class periods, two or three at a time. Make sure they are done by the time you get to **Activity M21**, in which the students will use a role-play to illustrate fire and succession in forests dominated by ponderosa, lodgepole, and whitebark pine.

Goal: Increase students’ understanding of ecological communities, ecosystems, and biodiversity by learning about some of the plants, animals, and fungi that live in forests of northern Rocky Mountains and North Cascades.

Objective: Given reference materials from the *FireWorks Encyclopedia* ([Middle_FireWorksEncyclopedia_NRM-NC.pdf](#)):

- Students can prepare a mask, costume, puppet, or other art work and use it in a 3- to 4-minute presentation that describes the biology of their organism and its relationship to fire.
- Students can understand that individual species have specific ways to survive the fires that were historically typical in the ecosystems where they live.

¹ For a very abbreviated version of this activity, have students perform charades. Assign each student one species from the *FireWorks Encyclopedia*. He/she reads the essay and then acts out the species (without sound). After classmates correctly guess the species, the actor tells the class which community the species lives in and one thing about its relationship with fire.

Standards:		6th	7th	8th
CCSS	Reading Informational Text	1, 2, 4, 7, 10	1, 2, 4, 10	1, 2, 4, 10
	Writing	2, 4, 7, 10	2, 4, 7, 10	2, 4, 7, 10
	Speaking/Listening	1, 2, 4, 6	1, 2, 4, 6	1, 2, 4, 6
	Language	1, 2, 3, 4, 6		
	Reading Standards Science/Tech	1, 2, 3, 4, 7, 10		
	Writing Standards Science/Tech	1, 2, 4, 7, 10		
NGSS	Ecosystems: Interactions, Energy, Dynamics	LS2.A, LS2.C		
	Heredity: Inheritance and Variation of Traits	LS1.B		
	Biological Evolution: Unity and Diversity	LS4.C		
	Earth's Systems	ESS2.D		
	Earth and Human Activity	ESS3.A		
EEEEGL	Strand 1	A, B, C, E, F, G		
	Strand 2.2	A,C		

Teacher background: Different kinds of plants and animals have different needs. For example, some plants grow well only in sunny openings, while others grow well in shade and still others require special soil conditions or large amounts of water. Some animals are good runners, some are good fliers, and some are good at hiding underground.

Different species that live in forests of the northern Rockies and North Cascades have different ways to survive fire and thrive afterward. These traits are sometimes specific to a certain kind of fire, so changes in the kinds of fire that occur in their habitat – or the frequency of fires - may make life difficult for the organism.

In this activity, students teach each other about some of the species that live in forests of the northern Rocky Mountains and the North Cascades that are dominated by ponderosa, lodgepole, and ponderosa pine. Each student “adopts” a plant, animal, or fungus, prepares an art work that depicts it, and presents the organism to the class. Students’ main source of information is the set of 2-page essays in the *FireWorks Encyclopedia* (**Middle_FireWorksEncyclopedia_NRM-NC.pdf**). They can seek information from other sources if you want them to do additional research, but that is not essential. Each student presentation should address organism’s needs, the kind(s) of fire typical in its habitat, and how the organism deals with fire. Students will need that information not only for this activity but also when they create a drama that illustrates the relationships of these 3 forest ecosystems to fire (**Activity M21**).

The *FireWorks Encyclopedia* contains essays on more than 30 species (**Table M11**). (Additional species are occasionally added if they pertain to one or more of the ecosystems featured here.) If you do not need all of the species for your class, be sure to **assign those shown in bold print (and shaded in blue)** first. This subset of species includes the dominant tree species in each

forest type, plus another important tree that is shade-tolerant; it also includes at least 1 herb, shrub, bird, and mammal from each forest type. Students will need these species to dramatize forest succession when they do **Activity M21**.

If you have a small class or a very limited time for Activity M21, you may decide to study just 1 of the 3 forest types in depth. In that case, select the species for students to adopt based on the description of their “Preferred forest type” in **Table M11**.

Materials and Preparation:

- Decide how to assign species to students. Make a copy of **Table M11** for recording assignments.
- Find the *FireWorks Encyclopedia* (**Middle_FireWorksEncyclopedia_NRM-NC.pdf**) in the trunk or provide students with computer access.
- Provide art supplies, if necessary.

Procedure:

1. Explain: Now that you know about the physics and chemistry of fire, it’s time to learn how wildland fire, which seems very destructive, can help some of the species that live in forest ecosystems of the northern Rocky Mountains and the North Cascades. We’ll learn about just a few species. This is a tiny fraction of the number of species present in forest ecosystems of the region – that is, the biodiversity in forests. In Glacier National Park, for example, there are more than 1,100 species of plants, 276 species of birds, and 71 species of mammals. Think how many kinds of insects, worms, and fungi there must be!
2. Explain the assignment: You will each “adopt” an organism that lives in forests of the northern Rockies and North Cascades. You will:
 - Learn about the organism from the essay in the *FireWorks Encyclopedia* (and other sources, if assigned).
 - Prepare a mask, costume, puppet, other art piece, or computer presentation that illustrates the organism and some aspects of its life history or relationship to fire.
 - Give a 3- to 4-minute presentation on the organism using the art piece. Include a basic description of the organism and its needs, the kind(s) of forest where it lives (ponderosa pine, lodgepole pine, and/or whitebark pine), the kind(s) of fire that occur there, and how the organism deals with fire.
3. Have a few students give their presentations during each class until all are done. Tell them to keep their costumes because they will be needed for another activity (**M21, Drama in the Forest: Fire and Succession, a Class Production**).

Assessment:

1. Have students give their 3- to 4-minute presentations. Have the rest of the students take notes, especially on the kind(s) of fire typical in that organism's habitat and how the organism deals with fire.
2. After all presentations, write the names of the organisms on strips of paper (or print them from the first column of **Table M11**) and put them in a hat.
3. Have each student pick out 3 organism names, write them down, and put them back into the hat.
4. Explain: Take out sheet of paper. Divide it into 3 sections. For each of the 3 organisms you selected from the hat, write:
 - The organism's name
 - 1 sentence about the ecosystem(s) where it is common (forests dominated by ponderosa, lodgepole, and/or whitebark pine)
 - 1 sentence about the kind(s) of fire that are typical in each organism's habitat
 - 1 sentence about ways in which each organism can survive fire and/or reproduce afterwards

Evaluation:	Excellent	Good	Fair	Poor
Presentation format	-Presentation was 3-4 minutes long. -Student used a creative, informative visual component.	-Presentation was substantially under or over 3-4 minutes. -Student used a visual component.	-Presentation was substantially over or under 3-4 minutes. -Visual component contained inaccuracies or was not used well in presentation.	-Presentation was greatly over or under 3-4 minutes. -Student did not prepare visual component.
Presentation content: <ul style="list-style-type: none"> • Organism's needs • Forest ecosystem(s) used • Typical kinds of fire in that forest • How organism deals with fire 	-Student provided accurate information on all 4 criteria at left.	-Student provided accurate information on 3 of the criteria at left.	-Student provided accurate information on 2 of the criteria at left.	-Student provided accurate information on 0-1 of the criteria at left.
Writing Component (selecting 3 names from a hat). For each organism: <ul style="list-style-type: none"> • Forest ecosystem(s) • Typical kind(s) of fire • How it deals with fire 	-For all 3 organisms, student clearly described all 3 criteria at left.	-For all 3 organisms, student described 2-3 criteria at left, or descriptions contained minor inaccuracies.	-Student described only 2 organisms, and description was incomplete or contained minor inaccuracies.	-Student described only 1 organism, and description contained major inaccuracies.

Table M11. Species in the *FireWorks Encyclopedia*

This table lists the species that can be “adopted” by students and presented to the class. If you do not need that many, **FIRST select the species shown in bold print and shaded in blue.** This shorter list of species will provide good coverage of the 3 forest types and will enable students to create effective dramatizations of forest succession if/when they do **Activity M21.**

Organism	Preferred forest type*	Responses to fire	Student assigned
American black bear	All	Can escape any kind of fire.	
American marten	All moist, old forests. Especially likes fir trees	OK with surface fire, prefers no fire.	
American three-toed woodpecker	All, especially LP because of tendency toward crown fire	Prefers forests after crown fire/severe fire.	
Armillaria root fungus	PP, in fir trees	Survives most fires underground but grows best in old forests.	
Arrowleaf balsamroot	PP	Sprouts after any fire from thick underground stem.	
Beargrass	Mainly LP	Grows back after fire from thick rhizomes.	
Black cottonwood	PP or moist ravines at higher elevations	Thick bark protects from some surface fires. Sprouts from base & roots after severe fire.	
Black fire beetle	Any forest that has just burned, even if it's still smoldering	Flies to trees that still may be hot, lays eggs under the bark.	
Black-backed woodpecker	All, especially LP because of tendency toward crown fire	Prefers severely burned forests	
Blue huckleberry	Mainly LP	Sprouts after most fires, grows well in openings created by severe fires.	
Clark's nutcracker	All, but especially adapted to WB	Escapes fires. Caches seeds in fire-created openings.	
Douglas-fir mistletoe	Mainly PP, also LP	Survives surface fires because they do not kill host tree.	
Douglas-fir	Mainly PP, also LP	Old trees survive surface fire because of thick bark.	

Elk	Uses all forest types, depending on season and food.	Can escape any kind of fire. Thrives on abundant food after fire.	
Engelmann spruce	Mainly LP, but also moist ravines at lower and higher elevations	Does not usually survive any kind of fire.	
Fireweed	Mainly LP but also PP and some WB forests	Sprouts from rhizomes after fire. Produces abundant seedlings in openings created by crown fire.	
Flammulated owl	PP	Prefers a mix of thickets and openings created by occasional surface fires	
Glacier lily	LP, WB, some PP	Sprouts from deep corm after any fire.	
Grizzly bear	All, but especially loves WB because of its seeds	Can escape any kind of fire.	
Grouse whortleberry	WB, some LP	Sprouts from rhizomes unless fire burned off the duff layer.	
Heartleaf arnica	Mainly PP and LP	Sprouts from rhizomes after most fires. Produces abundant seedlings after fire.	
Lodgepole pine	LP. Also occurs mixed with PP & WB.	Can survive some surface fires. Usually reproduces very well after crown fires.	
Mountain pine beetle	LP & PP. Thrives especially in dense LP forests that develop after crown fire.	Can survive surface fire and ground fire but not crown fire. Pine regeneration after crown fire provides optimum habitat.	
Northern flicker	All	Escapes fires. Thrives in any forest that has a lot of beetles.	
Pileated woodpecker	PP	Escapes fires. Needs large trees in mature forest for nesting. Can nest in stands that burn in surface fire.	
Pinegrass	Mainly PP	Sprouts from rhizomes after most fires.	
Ponderosa pine	Mainly PP, also some LP	Has thick bark. Thrives where occasional surface fires kill competitors.	

Quaking aspen	LP, also moist spots in PP	Has thin bark so is top-killed by most fires. Usually sprouts from roots after fire.	
Red squirrel	All. Really likes WB cones.	Avoids habitat with big openings created by large, severe fires.	
Red-backed vole	All habitat that is shady and moist	Can hide in burrow from fires but finds little food in burned environment.	
Saskatoon serviceberry	PP, also some LP	Sprouts from rhizomes after most fires.	
Smooth woodrush	Mainly WB, also in LP if enough moisture is available.	Sprouts from rhizomes after fire, thrives in fire-created openings.	
Snowbrush ceanothus	LP and PP	Crown fires produce heat that opens seeds. Plants can also sprout from roots.	
Subalpine fir	LP & WB	Does not usually survive any kind of fire.	
Western larch	PP & LP	Has thick bark so survives surface fires and sometimes crown fires. Reproduces well in fire-created openings.	
Western redcedar	PP, mainly in deep, moist valleys	Habitat rarely burns. Can survive some surface fires because of thick bark.	
White pine blister rust	WB	Dies if host tree (WB) is killed by fire, but always available to infest other, living WB trees.	
Whitebark pine	WB, some LP	Habitat does not burn often. When it does, fires are usually patchy. Can survive some surface fires.	
Wild onion	All	Can sprout after any fire that does not kill its bulb.	

* PP=ponderosa pine/Douglas-fir forest community; LP=lodgepole pine/subalpine fir community; WB=whitebark pine/subalpine fir community.